

Notice of Allowability

Application No.

10/699,767

Examiner

Stephen Rosasco

Applicant(s)

LEVINSON ET AL.

Art Unit

1756

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to filing 11/03/03.
2. ☒ The allowed claim(s) is/are 1-20.
3. ☒ The drawings filed on 03 November 2003 are accepted by the Examiner.
4. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 - a) ☐ All b) ☐ Some* c) ☐ None of the:
 1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).
 - * Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.

THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

5. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
 6. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
 - (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
 - 1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
 - (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.
- Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
7. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☒ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3. ☐ Information Disclosure Statements (PTO-1449 or PTO/SB/08),
Paper No./Mail Date _____
4. ☐ Examiner's Comment Regarding Requirement for Deposit
of Biological Material
5. ☐ Notice of Informal Patent Application (PTO-152)
6. ☐ Interview Summary (PTO-413),
Paper No./Mail Date _____
7. ☐ Examiner's Amendment/Comment
8. ☒ Examiner's Statement of Reasons for Allowance
9. ☐ Other _____

ALLOWANCE

The following is an examiner's statement of reasons for allowance: the claimed invention is distinguished over the prior art of record in that the prior art does not teach an extreme ultraviolet (EUV) lithography mask blank comprising a substrate having an upper surface and a lower surface;

and an edge surface connecting the upper surface and the lower surface; and a reflector film disposed over the upper surface and at least a portion of the edge surface such that a region of the reflector film disposed on the edge surface is non-planar with an upper surface of a region of the reflector film disposed on the upper surface of the substrate.

In addition is taught a reflector film disposed over the upper surface of the substrate with a backside conductive layer disposed on the lower surface of the substrate and a means to electrically couple the conductive layer and the reflector film.

The applicant discusses the limitations of the prior art in that the EUV light used to expose the wafer generates photoelectrons, causing the top of the mask 10 (e.g., the absorbers 16 and multilayer stack 14) to become electrically charged. This condition can result in particle attraction and/or electrostatic discharge (ESD) damage to the mask 10, both of which can lead to image pattern defects. Unfortunately, attempts to ground the absorbers 16 and/or multilayer stack 14 using direct mechanical contact will also lead to particle attraction and image pattern defects.

Galen et al. (6,893,780) teach a photomask assembly, comprising: a substrate; a patterned layer formed on at least a portion of the substrate, the patterned layer including: active region; a frame region; and an electrostatic discharge (ESD) pattern formed

between an outer perimeter of the active region and an inner perimeter of the frame region, the ESD pattern exposing a surface of the substrate and operable to reduce ESD effects between the frame region of the patterned layer and the active region of the patterned layer; and a pellicle assembly defined in part by a pellicle frame and a pellicle film attached thereto, the pellicle frame coupled to the exposed surface of the substrate opposite the pellicle film.

And further comprising the frame region including a fuse pattern operable to monitor electrostatic stress associated with the photomask.

And further comprising the fuse pattern including a first pattern and a second pattern, the first pattern operable to monitor electrostatic stress created between at least two adjacent features in the patterned layer and the second pattern operable to monitor electrostatic stress created between one or more features in the active region of the patterned layer and the frame region of the patterned layer.

Therefore, Galen et al. teaches coupling the pellicle frame to the exposed surface of the substrate but does not teach the use of a backside conductive layer disposed on the lower surface of the substrate and a means to electrically couple the conductive layer and the reflector film.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

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Conclusion

Any inquiry concerning this communication or earlier communications from the Examiner should be directed to Stephen Rosasco whose telephone number is (571) 272-1389. The Examiner can normally be reached Monday-Friday, from 8:00 AM to 4:30 PM. The Examiner's supervisor, Mark Huff, can be reached on (571) 272-1385. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

A handwritten signature in black ink, appearing to read "S. Rosasco", with a stylized, sweeping flourish extending from the end of the name.

S. Rosasco
Primary Examiner
Art Unit 1756

S. Rosasco
06/13/05